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Introduction

The analysis of energy requirements and availability of the Soviet Bloc and Western Europe is based on analysis of oil, coal, and electric power. Peat and wood as fuel were only considered in connection with requirements for oil and coal.

While production data for the entire area are believed reasonably reliable, considerable error probably exists in the requirements. This results from the difficulties in estimating the peacetime requirements of the USSR, the military requirements of Soviet forces, and the rationed wartime requirements for the entire area. An effort was made to ration energy consumption, particularly oil, to the minimum level necessary to permit continued industrial production essential in a war economy. It has not been possible in the case of energy to define that level precisely. This does not prove to be a critical question in the cases of coal and electric power, but it is critical in the case of oil. Main reliance is placed on judgment of analysts experienced in the individual energy fields.

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I. Conclusions

1. The occupation of Western Europe would increase the available energy supply to the Soviets by 55% and give them 43% of the world total. 1/

2. Rationing of coal and electric power in Western Europe to reduce consumption drastically for uses not essential in a war economy would bring a balance between requirements and availability in Europe and the USSR with the capacity for war production at about the current level, and still make coal available for conversion of some oil consuming equipment in Western Europe.

3. Drastic rationing of petroleum products, including consideration of conversion from oil to coal, would leave an annual deficit in the combined area of about 8.0 million metric tons. This is about 13% of the total minimum essential requirements of the combined area or 48% of the rationed civil requirements of Western Europe as estimated under conditions of strict Soviet control.

4. Stocks of petroleum products in existence in the Soviet Bloc and Western Europe might be equivalent to the annual deficit but it is improbable that the Soviets would elect to reduce reserve stocks 8.0 million metric tons if an allied invasion were anticipated.

5. Balancing petroleum consumption against availability in the combined area by further rationing could be accomplished leaving an effective economy and a large net gain in energy for industrial production as a result of occupation of Western Europe. However, adjustment to such severe rationing would probably handicap essential war industries. The restrictions on use of motor transport, farm tractors and other forms of mobile motive power and the problem of industrial conversion to coal would probably be so severe as to inflict penalties on the economy.

1/ Coal, petroleum and hydroelectric power.

6. The area of present Soviet Bloc would have surplus of about 8.6 million metric tons after meeting minimum civil and military requirements of the area while Western Europe would have an area deficit of about 16.6 million metric tons. Transportation would be adequate to handle the essential military and civil requirements of the Bloc, but would limit the movement of petroleum to Western Europe to about 13 million metric tons.

7. Western Europe would have about 50% of minimum essential civil requirements if the deficit of the combined area were absorbed there, or not more than about 80% of minimum requirements due to transportation even with further rationing in the Soviet Bloc.

8. The problem of establishing control and reorienting the Western European economy to Soviet support would be complicated by the petroleum supply and transportation situation.

9. The oil of the Middle East would make only a minor contribution to the Soviet supply during the period mid-1952 to mid-1954 if only overland transportation were available. In order to move sizeable quantities of Middle East oil it would be necessary for the USSR to acquire additional tankers and have the ability to use them freely. These could be employed most advantageously between the pipeline terminals in the Eastern Mediterranean and non-Satellite European ports (the rail systems from Satellite ports could not absorb an additional east-west burden). Although these ships could also move substantial quantities of crude oil between the pipeline terminals and the Black Sea, a major expansion of USSR consumption would be precluded by USSR refinery facilities and tank car limitations. (Movement of oil by tanker from the Persian Gulf to the Far East would not represent a major gain unless the Middle East refineries were in full operation.)

10. The excess refining capacity that would exist in Western Europe under the assumed Soviet occupation would represent a potential for limited use and an important cushion against war damage to refineries. Existing transport facilities would permit the movement of sufficient crude to Western Europe for refining and supply of the major part of the military and minimum essential civil requirements.

II. Discussion

1. Coal is the major source of energy in the Soviet Bloc and Western Europe. During the period of one year beginning 1 July 1952 under conditions of assumed occupation by the Soviets, coal would represent 89.0% of energy supply, 1/ petroleum 9.0% and hydroelectric power 2.0%. The peacetime requirements exceed the energy supply of the combined area, and the deficit is offset by imports of coal and oil into Western Europe. Under the assumed occupation of the Soviets drastic rationing could reduce total energy consumption to level of availability and leave industries, essential to the support of a war economy, in substantially full operation. Non-essential industries and civilian consumption would need to be severely restricted. Although total energy availability would thus theoretically equal drastically rationed requirements, shortages would develop due to impracticality of full substitution of the various forms of energy sources. While consumption of electric power and coal can be balanced with availability without sharp curtailment of war production, a deficit would exist in petroleum products.

2. Electric Power

Production of electric power for the combined area would total about 380.4 billion kilowatt hours for one year beginning 1 July 1952 under assumed Soviet occupation. This assumes a reduction of about 10% in Western Europe and no reduction in the Soviet Bloc. The production in Western Europe and the Soviet Bloc divided between thermal and hydroelectric is estimated as follows. (Analysis of Electric Power production is presented in Annex A.)

1/ Coal, petroleum and hydroelectric power.

ELECTRIC POWER (Rationed)
1 July 1952 - 1 July 1953

Billion Kilowatt Hours

	Hydroelectric	Thermal	Total
Soviet Bloc	22.4	149.6	172.0
Western Europe	115.8	92.6	208.4
TOTAL	138.2	242.2	380.4

The imposition of a 10% reduction in power production would have a substantial effect on the Western European standard of living but would not seriously affect essential war production. New industrial construction would probably be postponed and expansion of war industries would be impossible. Although the above table reflects a 10% reduction in electric power production in Western Europe, the availability of coal might not necessitate a cut that drastic.

3. Coal

Under present conditions the USSR is about in balance in coal production and requirements, while the European Satellites have a surplus position. Western Europe has a peacetime deficit which is offset by imports from the Soviet Bloc, the UK, and the US. China has adequate supplies, but any surplus is not effective in the European balance due to the transportation distance involved.

In event of occupation of Western Europe by the Soviets the consumption could be reduced by drastic rationing to provide a surplus without severe curtailment of essential war industries. Non-essential industries and home use would need to be drastically curtailed. The surplus of coal thus obtained combined with the surplus from the European Satellites would be available for use as a substitute for oil. The conversion from oil to coal is reflected in the rationing of petroleum consumption. The developments

of estimates of consumption under drastic rationing restrictions is based largely on assumptions of probable reductions that would be made rather than on any detailed determination of consumption, industry by industry. However, even though the assumptions may be somewhat arbitrary, it is probable that the saving in coal can exceed the capacity of the economy to absorb the surplus as substitute for oil. For the purposes of this study the depth of the rationing is probably not a critical estimate. The requirement-availability of coal in the Soviet Bloc and Western Europe during the first year of occupation beginning 1 July 1952 is as follows. (Analysis of coal requirements and availability is presented in Annex B.)

COAL
1 July 1952 - 1 July 1953
Millions of Metric Tons Hard Coal Equivalent

	Requirement (Rationed)	Availability	Surplus
Soviet Bloc	486.1	507.6	21.5
Western Europe	271.8	298.0	26.2
TOTAL	757.9	805.6	47.7

One feature that does not appear in total coal availability-requirement balance is metallurgical coke. Separate analysis indicates that under the assumed Soviet occupation the supplies of metallurgical coke would be nearly adequate for the essential requirements. A deficit of only 2.5% is indicated which is within the margin of error of the estimates.

4. Petroleum

The Soviet Bloc is producing petroleum products sufficient to meet the closely controlled requirements for consumption and to establish reserve stocks. In event of war and absence of war damage the Bloc can meet, from production, drastically rationed civil requirements, the estimated military requirements and possibly have 3.4 million metric tons for other distribution.

Western Europe would have a deficit in the order of 11.4 million metric tons. In the overall balance for the entire area there is an indicated deficit of 8.0 million metric tons. During the second year of occupation it might prove feasible with additional conversion to coal to reduce the deficit to 5.0 million metric tons.

The petroleum supply position for the Soviet Bloc and Western Europe for the first year of occupation beginning 1 July 1952 is as follows. (Analysis of petroleum availability and requirements is presented in Annex C.)

PETROLEUM PRODUCTS
1 July 1952 - 1 July 1953
(millions of metric tons)

	Requirements (Rationed)	Availability	Balance
Soviet Bloc			
Civilian	33.0		
Military	13.1		
Total Soviet Bloc	46.1	49.5	plus 3.4
Western Europe (civilian)	16.6	5.2	minus 11.4
Total Bloc and Western Europe	62.7	54.7	minus 8.0

Stockpiling has taken place in the Soviet Bloc, but available data are inadequate to permit quantitative estimates. Further, information on current stocks in Western Europe is incomplete. While stocks might reasonably be considered adequate to offset indicated deficit, it is improbable that the Soviets would elect to reduce reserve stocks for Western European civil consumption. Meeting the deficit by further rationing would reduce the production of industries essential in a war economy. While it is impractical to determine precisely the effect on the economy, it is probable that the further rationing would be costly although leaving an effective war

potential. In any event, there would be great advantages to acquisition of additional oil for full development of the economic potential of the combined area particularly in event that a prolonged war of attrition were in prospect.

The quantity of oil produced in the Middle East or in Iran alone would readily solve the deficit and remove limitations on the economy imposed by scarcity of oil supplies. With the assumption of occupation of the Middle East the question for the purposes of this study becomes one of transportation.

The refinery capacity of Western Europe would be far in excess of indigenous crude production. The excess capacity including modern installations would give the Soviets additional flexibility and would represent an important cushion against damage to refineries. Crude oil could be transported to Western Europe for refining and supply of the Soviet military forces and the essential war industries.

Operation of some of the modern Western European capacity would be attractive from the viewpoint of aviation gasoline supplies. While the European capacity is not adaptable to production of more than small quantities of grade 100/130 or higher, it could make major contributions in supply of the USSR grades 95/130 and 95/115. (Minor quantities of iso-octane or alkylate from the USSR would probably be required for final blending.)

5. Petroleum Transportation

The total deficit in Western Europe, including an assumed 40% total Soviet military requirements to be expended in that area amounts to 16.6 million metric tons. The combined capabilities of the Soviet and Satellite transport systems for the movement of petroleum from the Soviet Bloc to Western Europe during the first year of a war starting in 1952 are believed to be in the neighborhood of 13 million metric tons. This estimate takes into account the assumed necessity of distributing 35.5 million tons of petroleum annually within the USSR and to the Communist Far East, as well as

3.9 million tons within the European Satellites. Of the 13 million tons which could be delivered to Western Europe, it has been estimated that slightly over 3 million would originate in the European Satellites and the remainder would come from the USSR itself. The initial limiting factors in this situation would be a shortage of Soviet railway tank cars and the small size of the present Soviet-controlled Baltic and Black Sea tanker fleets. Under the assumed conditions, these factors would restrict deliveries from the USSR westward to about 10 million tons. Even if the tank car shortage were overcome, however, only about one million additional tons of petroleum could be moved westward from the USSR before the surplus capacity of the Satellite transport systems to receive traffic from the east was reached. Furthermore, because the principal limiting factors in Satellite transport would be the railroad transloading points and line capacities, the over-all capacity for movement to Western Europe could not be appreciably increased even by a large-scale effort to move petroleum in containers. Therefore, the only means by which the remaining Western European deficit could be overcome would be the acquisition of tanker tonnage and sea-air control in the Mediterranean for the movement of Middle East crude oil directly to Western Europe.

The Middle East oil with overland transport only could not contribute more than 0.3 to 1.0 million metric tons due to limitation of the rail lines. A large diameter line to the Caspian Sea would require two to three years to build with pipe available.